FACULTY OF ENGINEERING

B.E. 3/4 (Civil) I Semester (Suppl.) Examination, July 2012
TRANSPORTATION ENGINEERING

Time : 3 Hours]

[Max. Marks : 75

Instructions : 1) Answer **all** questions from Part – **A**.
2) Answer **any five** questions from Part – **B**.

PART – A (25 Marks)

1. State any three differences between the construction methods recommended by Mc Adam and Telford. 2

2. Define Lane distribution factor. Write current Indian practice on the distribution factors. 3

3. Briefly write the methods of attainment of super elevation. 3

4. Draw typical diagrams showing relationship between volume, speed and density of traffic. 2

5. Determine the spacing between vehicles on a single lane pavement of rural India for design speed = 50 km/hr., average length of vehicles = 5.5 m perception time = 2.5 seconds and co-efficient of friction = 0.5. 2

6. What is meant by negative super elevation ? 3

7. State the principal requirements of an ideal permanent way. 2

8. Write the standard dimensions of Wooden sleepers used for Broad gauge track. 3

9. Write the types of airports that indicate the type of landing or take off. 2

10. What is wind coverage and cross wind component ? 3

PART – B   (50 Marks)

11. a) A highway is provided with a horizontal curve of radius 300 m in a certain locality ? Calculate the super elevation needed to maintain the design speed of 90 km/hr. Calculate the maximum allowable speed, if the super elevation is limited to 0.07 and safe limit of transverse co-efficient of friction is 0.15.   **7**

   b) Derive the expression for calculating the SSD.   **3**

12. a) Enumerate the basic requirements of road intersections at grade, sketch the completely channelised intersection of tee form.   **6**

   b) Write a short note on OD studies.   **4**

13. a) Define kinematic viscosity and dynamic viscosity of bitumen. Write the standard units to represent above parameters.   **6**

   b) Determine the corner stress due to wheel load based on westergaards formula, the data given as below.

   CC slab thickness = 28 cm

   wheel load = 5100 kg

   radius of circular contact radius = 16.4 cm.   **4**

14. a) Calculate the maximum permissible speed on a 1° curve of a BG track with a maximum design speed of 130 km/hr. The super elevation provided is 50 mm and the transition length is 80 m. It is noted that the transition curve length is restricted due to site conditions.   **6**

   b) Explain with the help of neat sketches the points and crossings used in railways, indicating the precautions to be taken while laying the same.   **4**

15. a) What are the aircraft characteristics considered during the airport design and runway alignment ?

4

    b) An international airport is proposed with the runway length under standard conditions is 2105 m, the airport site has an elevation of 350 m. The monthly mean of the average daily temperature is 44° C and the monthly mean of the maximum daily temperature is 49° C at the airport site. Find the corrected runway length if the maximum and minimum variation of the runway profile is 100.20 m and 102.11m.

6

16. a) Explain various methods of calculating ESWL and derive the ESWL equation by equal deflection criterion.

6

    b) Write a short note on Wind Rose Diagrams ?

4

17. a) Explain briefly the different types of gradients used in railways giving their permissible values.

6

    b) An ascending gradient of 1 in 60 meets a descending gradient of 1 in 90. Determine the length of summit curve to provide (a) ISD (b) OSD for a design speed of 90 km/hr. Assume all other data suitably.

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